16(1),16(2)

AUTHOR: ~~Bondarenko, P.S.~~ SOV/41-11-3-13/16

TITLE: Book Review of P.F.Fil'chakov, Mathematical Calculating Practice, Kiyev, 1958, Ukrainian

PERIODICAL: Ukrainskiy matematicheskiy zhurnal, 1959, Vol 11, Nr 3, pp 331-333 (USSR)

ABSTRACT: The book is written for pedagogical institutes. It contains all that is essential on numerical methods. It is written excellently and closes a great gap in the Ukrainian mathematical literature.

SUBMITTED: April 20, 1959

Card 1/1

83221

S/041/60/012/002/001/005
C111/C333

16.3400 16.6500

AUTHOR: Bondarenko, P.S.

TITLE: New Method for the Numerical Integration of Ordinary Differential Equations

PERIODICAL: Ukrainskiy matematicheskiy zhurnal, 1960, Vol. 12, No. 2, pp. 118-131

TEXT: Let I be the interval $T_1 \leqslant t \leqslant T_2$ and let D be an open domain of the t,x-plane. Let $C^s(D)$ and $C^s(I)$ be the set of the real functions $f(t,x)$ or $x(t)$ which are s-times continuously differentiable in D or I. The author considers the equation

(1.1) $x' = f(t,x)$,

where $' = \frac{d}{dt}$ and $f \in C^s(D)$. An I containing t_0 and an $x \in C^{s+1}(I)$ are sought such that

(1.2) $(t,x(t)) \in D$ $(t \in I)$, (1.3) $x'(t) = f(t,x(t))$ $(t \in I)$, (1.4) $x(t_0) = x_0$.

The author proposes a numerical solution method. The polygonal line

Card 1/4

83221

S/041/60/012/002/001/005
C111/C333

New Method for the Numerical Integration of Ordinary Differential Equations

$$(2.1) \qquad \overset{n}{x}(t) = \overset{n}{x}_o + h_n \sum_{j=0}^{k-1} c_j + (t-t_k)c_k, \quad t_k \leqslant t \leqslant t_{k+1}, \quad k=0,1,\dots,n-1$$

constructed over $[t_o, T]$ with the step $h_n = \frac{T-t_o}{n}$ is denoted as h_n-approximation of the sought solution, if for every n it holds:

$$1.\ (t, \overset{n}{x}(t)) \in D, \quad t_o \leqslant t \leqslant T \qquad 2.\ \frac{1}{h_n} \int_{t_k}^{t_{k+1}} \left| f(t, \overset{n}{x}(t)) - c_k \right| dt = \mathcal{O}(h_n), \quad k=0,1,\dots,n-1.$$

The rectangle Π: $|t-t_o| \leqslant a$, $|x-x_o| \leqslant b$ with center in (t_o, x_o) is assumed to lie in D. The approximative values of the sought solution in the nodes $t_j = t_o + jh_n$ can be obtained with the aid of well-known methods (Euler, Runge, Adams) according to the scheme

$$(4.1) \qquad \overset{n}{x}_{k+1} = \overset{n}{x}_k + h_n c(t_k, \overset{n}{x}_k), \quad k = \nu, \dots, n-1$$

The function

Card 2/4

83221

S/041/60/012/002/001/005
C111/C333

New Method for the Numerical Integration of Ordinary Differential Equations

(4.11) $\overset{n}{x}{}^{*}(t) = \overset{n}{x}{}^{*}_{\nu} + h_n \sum_{j=\nu}^{k-1} c(t_j, \overset{n}{x}{}^{*}_{j}) + (t-t_k)c(t_k, \overset{n}{x}{}^{*}_{k})$, $h_n = \frac{\alpha^*}{n}$, $t_k \leqslant t \leqslant t_{k+1}$,

$k = \nu, \ldots, n-1$, constructed according to the scheme (4.1) is called actual h_n-approximation, if 1. $(t, \overset{n}{x}{}^{*}(t)) \in \Pi$, $t_\nu \leqslant t \leqslant t_o + \alpha^*$ and 2. $\left| \overset{n}{x}{}^{*}_{k} + h_n c(t_k, \overset{n}{x}{}^{*}_{k}) - \overset{n}{x}{}^{*}_{k+1} \right| \leqslant \delta$. Let x(t) be the rigorous solution, then $z(t) = x(t) - \overset{n}{x}{}^{*}(t)$, $t_\nu \leqslant t \leqslant t_o + \alpha^*$ is the error of the actual h_n-approximation.

Lemma 5. If in the construction of (4.11) in the nodal point $t = t_\nu$ $(\nu \geqslant 0)$ an error z_ν is admitted, then z(t) satisfies the equation

$$(5.1) \quad z(t) = z_\nu \exp\left\{ \int_{t_\nu}^{t} \int_{0}^{1} \frac{\partial f(\tau, \overset{n}{x}{}^{*} + \theta z)}{\partial x} d\theta d\tau \right\} + \int_{t_\nu}^{t} \varepsilon(s) \exp\left\{ \int_{s}^{t} \int_{0}^{1} \frac{\partial f(\tau, \overset{n}{x}{}^{*} + \theta z)}{\partial x} d\theta d\tau \right\} ds,$$

$$t_\nu \leqslant t \leqslant t_o + \alpha^*$$

Card 3/4

4

83221

S/041/60/012/002/001/005
C111/C333

New Method for the Numerical Integration of Ordinary Differential Equations

where

(5.2) $\tilde{\varepsilon}_n(t) = f(t, {}^n\!x^*(t)) - c(t_k, {}^n\!x_k^*)$, $t_k \leqslant t \leqslant t_{k+1}$, $k = \nu, \ldots, n-1$.

The equation (5.1) is solved by iteration, whereby it is put $z^0 = z^{(0)}(t) \equiv 0$, $t_\nu \leqslant t \leqslant t_0 + \alpha^*$. The author proves that for sufficiently small z_ν and h_n the iteration process converges. In this way the error of the numerical integration of the initial problem can be determined with arbitrary exactness. There are 2 references: 1 Soviet and 1 German.

SUBMITTED: July 4, 1959

4

Card 4/4

2

16.3400 16.6500

S/020/60/132/04/02/064

AUTHOR: Bondarenko, P.S.

TITLE: Numerical Continuation of the Solution to a Problem With Initial Conditions for Ordinary Differential Equations /b

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 132, No. 4, pp. 739-742

TEXT: The paper treats the numerical continuation of the solution of the problem

(k) $$\frac{dx}{dt} = f(t,x), \quad x(t_o) = x_o,$$

where $f(t,x)$ is a vector function continuous in the domain D of the $(t,x^{(1)},\ldots,x^{(p)})$ - space and $(t_o,x_o)\in D$, to the maximally possible interval $t_o \leqslant t \leqslant T^*$ of the t-line. Beside of the usual scheme of calculation

(2) $$\overset{n}{x}_{k+1} = \overset{n}{x}_k + h_n c(t_k, \overset{n}{x}_k), \; k = \nu,\ldots,n-1, \; \nu \geqslant 0$$

the author considers the method

(5) $$\overset{n_*}{x}_{k+1} = \overset{n_*}{x}_k + h_n c(t_k, \overset{n_*}{x}_k) - \delta_k, \; k = \nu,\ldots,n-1$$

X

Card 1/2

Numerical Continuation of the Solution to a Problem With Initial Conditions for Ordinary Differential Equations

S/020/60/132/04/02/064

which yields the "real h_n-approximating solution" of the problem (k) on $t_\nu \leqslant t \leqslant T$. Estimations of the error $u(t) = x(t) - \overset{n}{x}{}^{*}(t)$ are given. Relations to the methods of Euler, Runge and Adams are considered. There are 4 definitions, 3 lemmas and 3 long theorems without proofs. There is 1 non-Soviet reference.

ASSOCIATION: Kiyevskiy gosudarstvennyy universitet imeni T.G.Shevchenko (Kiyev State University imeni T.G.Shevchenko)

PRESENTED: January 30, 1960, by A.A.Dorodnitsyn, Academician

SUBMITTED: January 24, 1960

Card 2/2

POLOZHIY, Georgiy Nikolayevich; PAKHAREVA, Nadezhda Alekseyevna; STEPANENKO, Ivan Zakharovich; BONDARENKO, Pavel Stepanovich; VELIKOIVANENKO, Ivan Maksimovich; ROZENKNOP, V.D., red.; KRYUCHKOVA, V.N., tekhn.red.

[Mathematics] Matematicheskii praktikum. Pod red. G.N.Polozhego. Moskva, Gos.izd-vo fiziko-matem.lit-ry, 1960. 512 p.
(MIRA 14:1)

(Mathematics)

16.6500

39894
S/044/62/000/007/055/100
C111/C333

AUTHOR: Bondarenko, P. S.

TITLE: On the estimation of errors in the numerical integration of systems of ordinary differential equations

PERIODICAL: Referativnyy zhurnal, Matematika, no. 7, 1962, 28-29, abstract 7V134. ("Visnyk Kyivs'k. un-tu", 1960(1961), no. 3, ser. matem. ta mekhan., vyp. I, 55-75)

TEXT: Considered is the numerical solution of

$$\frac{dx}{dt} = f(t,x), \; x(t_o) = x_o \qquad (1)$$

where x, f(t,x) are real p-dimensional vector functions, and f(t,x) is defined in a certain domain D of the real $(t, x^{(1)}, \ldots, x^{(p)})$- space. The discrete set of points $t_j = t_o + jh_n$, $h_n = \frac{T - t_o}{n}$, $j = 0, 1, \ldots, n$ is chosen on the interval $t_o \leq t \leq T$; at each of these points is given a p-dimensional vector $c_j = (c_j^{(1)}, \ldots, c_j^{(p)})$. The piece-wise linear vector function

Card 1/7

$$\overset{n}{x}(t) = x_o + h_n \sum_{j=0}^{k-1} c_j + (t-t_k)c_k, \quad t_k \leq t \leq t_{k+1}$$

$$k = 0,1,\ldots,n-1$$

is constructed on the interval and is denoted as the h_n approximation of problem (1), if for every $n=1,2,\ldots$ the relations

$$(t, \overset{n}{x}(t)) \in D, \quad t_o \leq t \leq T$$

$$\frac{1}{h_n} \int_{t_k}^{t_{k+1}} \| f(t,\overset{n}{x}(t)) - c_k \| \, dt = O(h_n), \quad k=0,1,\ldots,n-1$$

hold. It is proven: If $f(t,x) \in C'(D)$, then the piece-wise linear function

$$\overset{n}{x}(t) = x_0 + h_n \sum_{j=0}^{k-1} f(t_j, \overset{n}{x}_j) + (t-t_k) f(t_k, \overset{n}{x}_k), \qquad (2)$$

$$t_k < t < t_{k+1}, \quad k=0,1,\ldots,n-1,$$

in which the vectors $\overset{n}{x}_{k+1}$ are calculated according to formula

$$\overset{n}{x}_o = x_o, \ \overset{n}{x}_{k+1} = \overset{n}{x}_k + h_n f\ (t_k, \overset{n}{x}_k),$$

is an h_n approximation of the solution of (1) on the interval $t_o \leq t \leq t_o + \alpha$, $\alpha = \min\left(a, \frac{b}{M}\right)$, where $|t - t_o| \leq a$, $\| x - x_o \| \leq b$ and $M = \max \| f(x,t) \|$ for the given x, t. The h_n approximate solution (2) of problem (1) converges for $h \to 0$ uniformly on $(t_o, t_o + \alpha)$ to the limit vector function $x(t) \in C'\ (t_o, t_o + \alpha)$, which is the unique solution to (1). The author then introduces the concept of the real h_n approximate solution to (1) $\overset{n*}{x}_k (k=0,1,\dots,n)$ which contains the rounding off errors of the quantities to be calculated. The real h_n approximate solution of (1) is calculated on $t_o \leq t \leq t_o + \alpha^*$ using the formula

APPROVED FOR RELEASE: 06/09/2000 CIA-RDP86-00513R000206220010-8"

S/044/62/000/007/055/100
C111/C333

On the estimation of errors in . . .

$$x^{n}(t) = x_{\nu}^{n*} + h_n \sum_{j=\nu}^{k-1} c(t_j, x_j^{n*}) + (t-t_k)c(t_k, x_k^{n*})$$

$$h_n = \frac{\tau}{n}, \quad t_k \leq t \leq t_{k+1}, \quad k = \nu, \ldots, n-1$$

where x^* is defined in various ways depending on the numerical method used. The estimate

$$\varepsilon_n(t) < \alpha_\nu \exp\left\{\left(\gamma + \sum_{i,j=1}^{p}{}' \max_{\Pi}\left|\frac{\partial f_i(t,x)}{\partial x^{(j)}}\right|\right)(t-t_\nu)\right\} + \int_{t_\nu}^{t} \|\tilde{\varepsilon}_n(s)\| \exp\left\{\left(\gamma + \sum_{i,j=1}^{p}{}' \max_{\Pi}\left|\frac{\partial f_i(t,x)}{\partial x^{(j)}}\right|\right)(t-s)\right\} ds; \quad (3)$$

Card 4/7

APPROVED FOR RELEASE: 06/09/2000 CIA-RDP86-00513R000206220010-8"

for the error $z(t) = x(t) - x^{*}(t)$, where $x(t)$ is the rigorous and $x^{*}(t)$ is the real h_n approximate solution of (1), is given assuming that the error z_ν is made at point $t = t_\nu$; at point $t=t_k (k=\nu, \ldots, n)$ is given the estimate

$$\sigma_n(t_k) < \sigma_\nu \exp\left\{\left(\gamma + \sum_{i,j=1}^{p}{}' \max_{\Pi}\left|\frac{\partial f_i(t,x)}{\partial x^{(j)}}\right|\right)(t_k - t_\nu)\right\} + \int_{t_\nu}^{t_k} \|\tilde{\varepsilon}_n(s)\| \exp\left\{\left(\gamma + \sum_{i,j=1}^{p}{}' \max_{\Pi}\left|\frac{\partial f_i(t,x)}{\partial x^{(j)}}\right|\right)(t_k - s)\right\} ds, \tag{4}$$

where

$$\sigma_\nu = \sqrt{\sum_{i=1}^{p}\left[z_\nu^{(i)}\right]^2}, \quad \gamma = \max\left\{\max_{\Pi}\left|\frac{\partial f_i(t,x)}{\partial x^{(i)}}\right|, \ i=1,\ldots,p\right\},$$

$$\|\tilde{\varepsilon}_n(s)\| = \sqrt{\sum_{i=1}^{p}\left[f_i\left(t, \overset{n}{x}{}^{*}(t)\right) - c^{(i)}\left(t_k, \overset{n}{x}{}^{*}_k\right)\right]^2}.$$

S/044/62/000/007/055/100
On the estimation of errors in . . . C111/C333

The dash (′) with the sums means that in the summation $i \neq j$; $\Pi: (|t - t_0| \leq a, \| x - x_0 \| \leq b)$. From the formulas (3), (4) the author obtains the error estimate for the numerical solutions of (1) according to the methods of Euler, Runge and Adams. From these estimates follows that, if

$$\gamma + \sum_{i,j=1}^{p}{}' \max_{\Pi} \left| \frac{\partial f_i(t,x)}{\partial x^{(j)}} \right| \leq 0$$

then the error of the numerical solution of (1) is bounded even if the numerical integration takes place on a sufficiently large interval. All these estimates are a posteriori. By following S.M.Lozinskiy (RzhMat, 1953, 2342) and introducing a certain non-singular matrix, the author modifies the above estimates of the numerical integration of (1). Finally, the author describes a calculation algorithm for the continuation of the real h_n approximate solution. The algorithm makes it possible to give both a guaranteed existence interval for the solution

Card 6/7

of the Cauchy problem (1) with sufficient exactness, and an estimate of the position of the solution curve.

[Abstracter's note: Complete translation.]

85510

S/021/60/000/003/002/010
A232/A029

16.3400 16.3900 16.6500

AUTHOR: Bondarenko, P.S.

TITLE: The Solution of Boundary Problems for One Class of Ordinary Differential Equations by the Method of Finite Differences

PERIODICAL: Dopovidi Akademyi nauk Ukrayins'koyi RSR, 1960, No. 3, pp. 300 - 304

TEXT: The paper considers the solution of the boundary problem (I), (II) by the application of the method of finite differences. The following example is given: let us assume that on the section $\alpha \leqslant t \leqslant \beta$ it became necessary to determine the solution of the differential equation

$$Lu \equiv \sum_{\nu=0}^{p} (-1)^{\nu} \frac{d^{\nu}}{dt^{\nu}} \left[P_{\nu}(t) \frac{d^{\nu}u}{dt^{\nu}} \right] = f(t), \qquad (I)$$

which (this solution) would satisfy on the ends of this section the conditions

$$l_i u \equiv \sum_{\nu=0}^{2p-1} \left[a_{i\nu} u^{(\nu)}(\alpha) + b_{i\nu} u^{(\nu)}(\beta) \right] = 0, \quad i = 0, 1, \ldots, 2p-1, \qquad (II)$$

where the coefficients $P_{\nu}(t)$ are fixed functions, differentiated uninterrupted-

Card 1/3

85510

S/021/60/000/003/002/010
A232/A029

The Solution of Boundary Problems for One Class of Ordinary Differential Equations by the Method of Finite Differences

ly on the section $\alpha \leqslant t \leqslant \beta$, f (t) is a fixed function being uninterrupted on this section, $a_{i\nu}$, $b_{i\nu}$ are certain constants, and where $u^{(\nu)} = \frac{d^\nu u}{dt^\nu}$. Separate cases of the problem (I), (II) are the boundary problems:

$$\sum_{\nu=0}^{p} (-1)^\nu \frac{d^\nu}{dt^\nu} \left[P_\nu (t) \frac{d^\nu u}{dt^\nu}\right] = f (t); \quad u^{(\nu)} (\alpha) = 0, \; u^{(\nu)} (\beta) = 0, \; \nu = 0, 1, \ldots, p - 1 \tag{1}$$

$$-\frac{d}{dt}\left[P_1 (t) \frac{du}{dt}\right] + P_0 (t) u = f (t)$$

$$au' (\alpha) - bu' (\alpha) = 0; \quad cu' (\beta) + du' (\beta) = 0 \tag{2}$$

$$\frac{d^2}{dt^2}\left[P_2 (t) \frac{d^2u}{dt^2}\right] + P_0 (t) u = f (t)$$

$$u (\alpha) = u' (\alpha) = 0; \quad u'' (\beta) = \frac{d}{dt}\left[P_2 (t) \frac{d^2u}{dt^2}\right]_{t=\beta} = 0 \tag{3}$$

To accomplish this solution, the author suggests a replacement of the differential expressions which are a part of (I) and (II) by difference expressions, and

Card 2/3

65510

S/021/60/000/003/002/010
A232/A029

The solution of Boundary Problems for One Class of Ordinary Differential Equations by the Method of Finite Differences

establishes conditions which guarantee the solvability of the obtained difference equation and the convergence of its solution toward the exact solution of the problem (I), (II). Proceeding from the theory of the general approximate methods of L.V. Kantorovych (Ref. 3), the author also determines the solvability of the corresponding exact equation. This determination is based on the solvability of the approximate equation obtained by the method of finite differences. Particular cases of the boundary problem (I), (II) frequently encountered in applications are considered. A theorem is formulated, which when fulfilling certain conditions is applicable to each of the boundary problems (1) - (3). There are 4 Soviet references.

ASSOCIATION: Kyyivs'kyy derzhavnyy universytet im. T.H. Shevchenka (Kiyev State University imeni T.H. Shevchenko)

PRESENTED: by Shtokalo, Y.Z., Academician, AS UkrSSR

SUBMITTED: April 4, 1959

Card 3/3

S/021/60/000/006/001/019
A153/A029

AUTHOR: Bondarenko, P.S.

TITLE: A New Method for the Numerical Integration of Ordinary Differential Equations

PERIODICAL: Dopovidi Akademiyi nauk Ukrayins'koyi RSR, 1960, Nr. 6, pp. 715 - 720

TEXT: The author introduces the concept of a real h_n-approximate solution of a problem with initial conditions for an ordinary differential equation of the first order $x' = f(t, x)$, $x(t_0) = x_0$ (5) and derives an integral equation which satisfies the error of that approximate solution. The segment of existence of the real h_n-approximate solution is established. An integrational process of solving the integral equation of error is proposed and a sufficient condition for its convergence is established. It is shown that the proposed integrational process of finding the error of the h_n-approximate solution of the above problem makes it possible to find its numerical solution with any given accuracy. Finally, the author indicates estimations of the error of numerical integration for obtaining an approximate solution of problem (5) obtained by the method of Euler or Runge

Card 1/2

S/021/60/000/006/001/019
A153/A029

A New Method for the Numerical Integration of Ordinary Differential Equations

(24 - 25), or by the method of Adams (26 - 27). There is 1 Soviet reference.

ASSOCIATION: Kyyivs'kyy derzhavnyy universytet im. T.H. Shevchenka (Kiyev State University imeni T.H. Shevchenko)

PRESENTED: by Y.Z. Shtokalo, Academician, AS UkrSSR

SUBMITTED: July 1, 1959

Card 2/2

PHASE I BOOK EXPLOITATION SOV/5222

Bondarenko, Prokofiy Stepanovich

Avtomatizatsiya protsessov domennogo proizvodstva s primeneniyem schetno-reshayushchikh ustroystv (Automation of Blast-Furnace Processes With the Use of Computers) Moscow, Gosenergoizdat, 1960. 143 p. 5,000 copies printed. (Series: Biblioteka po avtomatike, vyp. 20)

Editorial Board: I. V. Antik, S. P. Veshenevskiy, V. S. Kulebakin, A. D. Smirnov, B. S. Sotskov, Ye. P. Stefani, and N. N. Shumilovskiy; Ed.: V. P. Bychkov; Tech. Ed.: K. P. Voronin.

PURPOSE: This book is intended for technical personnel who are concerned with the automation of blast-furnace processes, but who are not specially trained in the field of computation techniques.

COVERAGE: The book contains information on elementary computers and certain intricate computers which are used in the automation

Card ~~1/5~~

of production processes in ferrous metallurgy. Various systems for controlling the blast-furnace process are discussed and some Soviet computers for these control systems are described. No personalities are mentioned. There are 51 references: 46 Soviet, and 5 English.

TABLE OF CONTENTS:

BONDARENKO, P. S.

Doc Phys-Math Sci - (diss) "Studies into computing algorithms of approximation integration of differential equations by the method of finite differences." Kiev, 1961. 23 pp; (Joint Academic Council of Institutes of Mathematics, Physics, and Metallophysics of the Academy of Sciences Ukrainian SSR); 180 copies; free; list of author's works on pp 22-23 (17 entries); (KL, 6-61 sup, 191)

27329

S/021/61/000/002/003/013
D210/D303

16.6500 16.3900

AUTHOR: Bondarenko, P.S.

TITLE: On the problem of stability of calculation algorithms, based on the method of differences, for solving Cauchy's problem for systems of ordinary equations

PERIODICAL: Akademiya nauk Ukrayins'koyi RSR. Dopovidi, no. 2, 1961, 153 - 157

TEXT: The paper gives a generalization of the results of P.S. Bondarenko (Ref. 1: Visn. KDU, ser. astron., mat. ta mekh. 2, 1, 47, 1959). Suppose that the problem is

$$x' = f(t, x), \quad x(t_0) = x_0 \quad (' = \frac{d}{dt}) \qquad (k)$$

($f(t, x)$ is the given vector function, determined and continuous in the domain D of the space $(t, x^{(1)} \ldots x^{(p)})$, $(t_0, x_0) \in D$ and

Card 1/6

27329
S/021/61/000/002/003/013
D210/D303

On the problem of stability of ...

the unknown function): the process of solving (k) with the aid of the difference method N leading to a discrete function $\overset{h}{x}_i$, calculated on the network

$$t_j = t_0 + jh, \quad h > 0, \quad j = 0, 1, \ldots, P \qquad (1)$$

is called the calculation algorithm of solution for this problem and is denoted by $A_N(\overset{h}{x})$. The process of solution with the aid of the method N^* giving an approximate function $\overset{h}{x}{}_i^*$ is called the real calculation algorithm and is denoted by $A_N^*(\overset{h}{x}{}^*)$. Four more definitions are given and the following theorems formulated: Theorem 1: Let: 1) a real approximate solution of the problem (k) exist for an arbitrary initial value η_ν^* from

Card 2/6

27329
S/021/61/000/002/003/013
D210/D303

$$//\eta_\nu - \eta_\nu^*// < \sigma \qquad (2)$$

corresponding to the algorithm ... $A_N^*(\overset{h}{x}{}^*)$, and I_ν be a segment of a segment of the t-axis where all these solutions are defined, D^* is a closed domain inside D, which contains the graphs of the approximate solutions $\overset{h}{x}_{\eta_\nu^*}(t)$ if $t \in I_\nu$ and δ is arbitrary; 2) f(t, x), should be continuous inside D and satisfy the condition

$$//f(t, x) - f(t, y)// \leqslant N(t)//x - y// \qquad (5)$$

in a sufficiently close neighborhood of the zero of the difference x - y, x, $y \in D^*(t)$, $t \in I$, with the function N(t) which is summable on I ;

$$\tilde{\varepsilon}_h(t) = (\overset{h}{x}_{\eta_\nu}(t))' - f(t, \overset{h}{x}_{\eta_\nu}(t)), \; t \in I_\nu - \bar{S}_h \qquad (6)$$

On the problem of stability of ... 27329
S/021/61/000/002/003/013
D210/D303

$$\tilde{\xi}_h^*(t) = (x^{h_*}_{\eta_\nu^*}(t))' - f(t, x^{h_*}_{\eta_\nu^*}(t)), \quad t \in I_\nu - \bar{S}_h \tag{7}$$

$$\delta(t) = x^h_{\eta_\nu}(t) - x^{h_*}_{\eta_\nu^*}(t), \quad \gamma(t) = //\delta(t)//^{-1}(f(t, x^h_{\eta_\nu}(t)) - f(t, x^{h_*}_{\eta_\nu^*}(t)), \delta(t)), \quad t \in I_\nu - \bar{S}_h^o, \tag{8}$$

$\bar{S}_h$ should be the set of vortices of the broken lines $x_{\eta_\nu}^h(t)$ and $x^{h_*}_{\eta_\nu^*}(t)$. On I_ν, $\bar{S}_h^o$ - the set of those points of this segment at which $\delta(t) = 0$. In order for the real approximate solution of (k) to depend continuously on the initial error of calculation δ_ν on I_ν, it is necessary and sufficient that a positive number ε_{δ_ν} exist, the inequality being uniformly valid with respect to t, $t \in I_\nu$

Card 4/6

and δ, $0 < \delta \leq \delta_h^*$; $\varepsilon_{\delta_\nu} \to 0$ if $\delta \to 0$. Theorem 2: Let $A_N(\overset{h}{x})$ be a convergent calculation algorithm and let the conditions (1) - (3) of Theorem 1 be fulfilled. In order for the real approximate solution of (k), corresponding to the algorithm $A_N(\overset{h}{x}{}^*)$ to be stable on I_ν it is necessary and sufficient that positive number ε_h^* and δ_h^* exist for any h, $0 < h \leq h_0$, the inequality

$$\left|\int_{t_\nu}^{t} \|\delta(s)\|^{-1}(\delta(s), \tilde{\varepsilon}_h^*(s)) \exp\left\{\int_{s}^{t} \gamma(\tau)\, d\tau\right\} \cdot ds\right| \leq \tilde{\varepsilon}_h^* \qquad (12)$$

being uniformly valid with respect to t, $t \in I$ and δ, $0 < \delta \leq \delta_h^*$; $\tilde{\varepsilon}_h \to 0$ if $h \to 0$. Theorem 3. If $A_K(\overset{h}{x})$ is a convergent algorithm and the conditions (1) - (3) of Theorem 1 are fulfilled, the class 4

27329

On the problem of stability of ... S/021/61/000/002/003/013
D210/D303

of real calculation algorithms $A_K(\overset{h}{x}{}^{*})$ satisfying the condition

$$\lim_{h \to 0} \sup_{0 < k < p-1} h^{-1} \int_{t_k}^{t_{k+1}} \| \tilde{\varepsilon}_h^{*}(s) \| ds = 0 \quad (13)$$

for any δ, $0 < \delta \leq \delta_h^*$ is certainly a class of stable calculation algorithms. No proofs of the theorems are given. There are 4 references, 2 Soviet-bloc and 2 non-Soviet-bloc.

ASSOCIATION: Kyyivs'kyy derzhavnyy universytet (Kiyev State University)

PRESENTED: by Academician AS UkrSSR, Y.Z. Shtokalo

SUBMITTED: April 29, 1960

Card 6/6

25150

S/021/61/000/004/002/013
D213/D303

16.3900 16.6500

AUTHOR: Bondarenko, P.S.

TITLE: On the stability of computation algorithms of the approximate solution of boundary problems for differential equations by the method of finite differences

PERIODICAL: Akademiya nauk Ukrayins'koyi RSR. Dopovidi, no. 4, 1961, 415 - 419

TEXT: This article is a generalization of the results of the author's previous work (Ref. 1: DAN URSR, 153/1961). A p-dimensional space with a rectangular coordinate system $ox_1 \dots x_p$ is considered. A given region Ω is bounded by a piece-wise smooth surface Γ. In Ω the differential equation $Lu = f$ (1) holds, where $u(x)$ is to be determined, $f(x)$ is given in the region $\bar{\Omega} = \Omega + \Gamma$, L is some differential operator, and the boundary conditions are

Card 1/6

25150

$$\left.\begin{array}{l} l_1^{(i)} u = 0, \ i = 1, \ldots, r_1; \\ \ldots\ldots\ldots\ldots\ldots \\ l_\sigma^{(i)} u = 0, \ i = 1, \ldots, r, \end{array}\right\}. \qquad (2)$$

for $r_1, \ldots, r_\sigma$, on the given pieces $\Gamma_1, \ldots, \Gamma_\sigma$ of Γ, where $l_k^{(1)}$ are given differential operators. A system of points is chosen such that $\bar{\Omega}_{h_k} \subset \bar{\Omega}$, $h_1, h_2, \ldots \to 0$, and $\bar{\Omega}_h$ is the fixed element of the system. $\bar{\Omega}$ is then replaced by a network $\bar{\Omega}_h$, and the derivatives occurring in Lu are written in terms of the values of u(x) at the intersections $\bar{\Omega}_h$ · Ω_h^o then denotes the subset of interior intersections and γ_h the set of intersections which lie in the boundary zone of $\bar{\Omega}_h$. Substitution in (2) gives

APPROVED FOR RELEASE: 06/09/2000 CIA-RDP86-00513R000206220010-8"

25150

$$\left.\begin{array}{l} l^{(i)}_{h_1} u_h \quad i = 1, \ldots, r_1; \\ \ldots\ldots\ldots \\ l^{(i)}_{h_\sigma} \quad u_h \ i = 1, \ldots, r_\sigma \end{array}\right\}, \qquad (3)$$

evaluated at the intersections γ_h. Eq. (3) is said to produce a complete complementary set for $\{L_h u_h\}_j$, $j \in \Omega^o_h$. It follows that $Au = f$ (4) where the f's are a set of sufficiently smooth functions in Ω, whose moduli are given by

$$//f// = \int_\Omega f^2 d\Omega,$$

and A is a set of sufficiently smooth functions u(x) satisfying (2) and for which the significance of L depends on the set of f. The intersections are denoted by indices 1, ..., N_h . $A_h u_h$ is an N_h-

APPROVED FOR RELEASE: 06/09/2000 CIA-RDP86-00513R000206220010-8"

25150

dimensional vector whose components are the values of (3) evaluated at the intersections γ_h, and the values of

$$\{L_h u_h\}_j, \quad j \in \Omega_h^o \qquad (5)$$

evaluated at the intersections Ω_h^o arranged in order, and $(Au)_h$ is an N_h dimensional vector, whose components are the differential expressions on the left-hand-side of (2) evaluated at the intersections γ_h and the values of Lu at the intersections Ω_h^o. Further $A_h^o u_h$ and $(Au_h)^o$ are the N_h-dimensional vectors derived from $A_h u_h$ and $(Au)_h$ by replacing all the terms of $A_h u_h$ and $(Au)_h$ which arise from values at γ_h^o by zero. $A_{\gamma_h} u_h$ and $(Au)_{\gamma_h}$ are N_h-dimensional vectors derived in a similar manner by replacing the terms derived from values at Ω_h^o by zero. A_h is the difference operator A_h defined for the set of N_h-dimensional vectors u_h where

$$A_{\gamma_h}\tilde{u}_h = 0 \qquad (6)$$

[Abstractor's note: $\tilde{A}_h$ appears wrongly in the text as $\sim A_h$]. Under these conditions it follows that

$$A_{\gamma_h}u_h = 0 \ (7), \quad \text{and} \quad \tilde{A}_h\tilde{u}_h = f_h (8)$$

where f_h is an N_h-dimensional vector whose components are arranged in similar order to those of $A_h u_h$, those corresponding to the intersections Ω_h^o being equal to the terms of the right-hand side of (4) and the others being equal to zero. The result obtained by the above method is called the exact solution. Approximate solution methods are then suggested. There is 1 Soviet-bloc reference.

25130

On the stability of ...

S/021/61/000/004/002/013
D213/D303

ASSOCIATION: Kyyivs'kyy derzhavnyy universytet (State University of Kyyiv)

SUBMITTED: May 15, 1960

Card 6/6

22762
S/041/61/013/001/001/008
B112/B202

16.3400 16.6500

AUTHOR: Bondarenko, P. S.

TITLE: On a class of calculation algorithms for the approximate integration of ordinary differential equations with initial conditions

PERIODICAL: Ukrainskiy matematicheskiy zhurnal, v. 13, no. 1, 1961, 3-21

TEXT: The author studies a class of approximate solution algorithms for a set of differential equations: $x' = f(t,x)$ with the initial condition $x(t_0) = x_0$. He first derives conditions for the convergence and the stability for a general class of such solution algorithms. In the following he deals with a class K of stable methods of solution of the Euler, Runge, and Adams type. These types have the following approximation scheme in common: $x_{k+1} = x_k + h\,c(t_k,x_k)$, $\|c(t_k,x_k)\| \leqslant \beta M$, $\beta > 0$, $M = \sup\|f(t,x)\|$. The author proves the possibility and the uniqueness of the following algorithm a_K for continuing the real approximation solutions x^*: The i-th step of the algorithm a_K consists in an estimation of the

X

Card 1/2

error u(t): $\| u(t_o + \sum_{s=0}^{i-1} \alpha_s^*) \| \leqslant r_{i-1}$ by means of a majorant of u given by the author and in the determination of a parallelepiped Π_{i-1}: $|t - t_o - \sum_{s=0}^{i-1} \alpha_s^*| \leqslant a_{i-1}$, $\| x - x^*(t_o + \sum_{s=0}^{i-1} \alpha_s^*) \| \leqslant b_{i-1}$ and the number α_i^*: $\alpha_i^* = \min\left(a_{i-1}, \frac{b_{i-1} - r_{i-1} - \delta^*}{M_{i-1}}\right)$, where M_{i-1} refers to the parallelepiped Π_{i-1} and δ^* is an error bound. Thus, it is possible to determine the interval of existence of the required solution with sufficient accuracy and to estimate the position of the graph and the error. There are 7 Soviet-bloc references.

SUBMITTED: April 12, 1960

BONDARENKO, P.S., inzh.; BOGOMOLOV, R.Ye.

Automatic dispatcher control of mechanisms of continuous conveying systems. Mekh. i avtom.proizv. 15 no.3:33-40 Mr '61. (MIRA 14:3)

(Remote control) (Conveying machinery)

BOGOMOLOV, R.Ye.; BONDARENKO, P.S.

Practice of operating automated centralized control devices. Prom. energ. 16 no.12:16-21 D '61. (MIRA 14:12)
(Automatic control) (Coal preparation--Electronic equipment)

BONDARENKO, Pavel Stepanovich; ORLIK, O.L.[Orlyk, O.L.], red.; KHOKHANOVSKAYA, T.I.[Khokhanovs'ka, T.I.], tekhn. red.

[Study on computing algorithms for approximate integration of differential equations using the method of finite differences] Doslidzhennia obchysliuval'nykh algoryfmiv nablyzhenoho integryvannia dyferentsial'nykh rivnian' metodom skinchennykh riznyts'. Kyiv, Vyd-vo Kyivs'koho univ. 1962. 242 p. (MIRA 16:6)

(Algorithms) (Differential equations)

BONDARENKO, P.S.

Continuation of the solutions of differential equations. Dop. AN URSR no.1:3-4 '62. (MIRA 15:2)

1. Kiyevskiy gosudarstvennyy universitet. Predstavleno akademikom AN USSR I.Z.Shtokalo.
(Differential equations)

ACCESSION NR: AR4031070 S/0044/64/000/002/B071/B071

SOURCE: Referativny*y zhurnal. Matematika, Abs. 2B247

AUTHOR: Bondarenko, P. S.

TITLE: Continuous dependence of the solution for a system of ordinary differential equations

CITED SOURCE: Vistny*k ky*yivs'k. un-tu, no. 5, 1962, Ser. matem. ta mekhan., vy*p. 2, 28-33

TOPIC TAGS: ordinary differential equation system, solution continuous dependence, Cauchy problem

TRANSLATION: Conditions on the right-hand parts of a normal system of ordinary differential equations are derived, which guarantee that the Cauchy problem for this system has a unique solution depending continuously on the initial conditions. In addition, sufficient conditions are derived which ensure that this solution is bounded. A new method is established for determining the length of

ACCESSION NR: AR4031070

the segment in which the solution to the Cauchy problem exists. Author's summary

DATE ACQ: 19Mar64 SUB CODE: MM ENCL: 00

Card 2/2

S/021/62/000/007/003/008
I027/I227

AUTHOR: Bondarenko, P.S.

TITLE: On the interval of existence of a system of ordinary differential equations

PERIODICAL: Akademiya nauk Ukrayns'koy RSR, Dopovidi, no.7, 1962, 861-863

TEXT: Two theorems are formulated. The first establishes the interval of existence of a unique solution of a system

$$\frac{dx}{dt} = f(t,x), \quad x(t_o) = x_o \qquad (1)-(k)$$

where $f(t,x)$ is a (not necessarily continuous) vector function and the vector function $x(t)$ solving the system should be absolutely

Card 1/2

continuous. The second theorem gives conditions for the boundedness of the solution if the interval of existence is semi-infinite $t_0 \leq t < \infty$. The most important English language references read as follows: A. Wintner Amer. Journal of Math. 67,2,277 (1945) and 68,14, 173 (1946).

PRESENTED: by I.Z. Shtokalo, Academician, AS UkrSSR

SUBMITTED: December 8, 1961

BONDARENKO, P.S., inzh.

Automatic control of continuous conveying systems. Mekh.i avtom.proizv. 16 no.9:21-27 S '62. (MIRA 15:9)
(Conveying machinery) (Automatic control)

BONDARENKO, P.S., inzh.; LUNEV, G.I., inzh.; BORSUKOV, Ye.M., inzh.; IANOVSKIY, V.P., inzh.

Achievement of low stable speeds of a remotely controlled car pusher. Prom. energ. 17 no.11:17-22 N '62. (MIRA 15:12)
(Electric railway motors)

BONDARENKO, P.S.; PALILOV, I.M.

Automatic telpher transportation. Khim.prom. no.6:446-453 Je '62. (MIRA 15:11)

(Conveying machinery) (Automatic control)

BONDARENKO, P.S.; PALILOV, I.M.

Pusher conveyor with an automatic program control. Khim.prom. no.9:674-683 S '62. (MIRA 15:11)
(Conveying machinery) (Automatic control)

BONDARENKO, P. S.; PALILOV, I. M.

Automated systems of pneumatic transportation. Khim. prom. no.3:228-231 Mr '63. (MIRA 16:4)

(Pneumatic conveying) (Automatic control)

BONDARENKO, P.S.; PALILOV, I.M.

Automated scrapper-conveyor systems. Khim. prom. no.4:306-312 Ap '63. (MIRA 16:8)

BONDARENKO, P.S.; PALILOV, I.M.

Control of manipulators of automatic conveying systems.
Khim. prom. no.8:616-620 Ag '63. (MIRA 16:12)

ACCESSION NR: AP4020372 S/0021/64/000/003/0295/0299

AUTHOR: Bondarenko, P. S.

TITLE: Computational algorithms for approximate solution of operator equations

SOURCE: AN UkrRSR. Dopovidi, no. 3, 1964, 295-299

TOPIC TAGS: operator, operator theory, linear operator, algorithm, algorithm stability, operator equation

ABSTRACT: The present work is a continuation of previous studies, the results of which are extended to a rather broad class of linear operators designated in linear normalized spaces. Definitions are given for computational, real computational converging, regularly converging, stable and really stable computational algorithms for approximate solution of the operator equations. Orig. art. has: 22 formulas.

ASSOCIATION: Ky*yivs'ky*y derzhavny*y universy*tet (Kiev State University)

Card 1/2

APPROVED FOR RELEASE: 06/09/2000 CIA-RDP86-00513R000206220010-8"

ACCESSION NR: AP4020372

SUBMITTED: 23Oct63 DATE ACQ: 27Mar64 ENCL: 00

SUB CODE: MM NO REF SOV: 003 OTHER: 000

Card 2/2

ACCESSION NR: AP4012957 S/0020/64/154/004/0754/0756

AUTHOR: Bondarenko, P. S.

TITLE: Computation algorithm for an approximate solution of operator equations

SOURCE: AN SSSR. Doklady*, v. 154, no. 4, 1964, 754-756

TOPIC TAGS: mathematical analysis, algorithm, computation algorithm, operator equation, operator equation approximate solution, abstract space

ABSTRACT: Two abstract spaces M_1 and M_2 and the operator A for translating the elements from M_1 into an element of M_2, are given. It is necessary to find an element $x \in M_1$ with respect to the given element $y \in M_2$ such that the equality

$$Ax = y. \quad (1)$$

is fulfilled. It is assumed that the space M_1 and M_2 as well as the operator A are replaced by some other spaces $\bar{M}_1$, $\bar{M}_2$ and operator $\bar{A}$, translating the elements of $\bar{M}_1$ into elements of $\bar{M}_2$, and it is also supposed that instead of the initial problem, the following problem is

Card 1/3

ACCESSION NR: AP4012957

solved: it is necessary to find some element $\bar{x} \in \bar{M}_1$ with respect to the element $\bar{y} \in \bar{M}_2$ such that the equality

$$\bar{A}\bar{x} = \bar{y}. \qquad (2)$$

will be fulfilled. The totality of the computational operations permitting the setting up of such an element $\bar{x} \in \bar{M}_1$ so that equality (2) can be fulfilled is then denoted by N ($\bar{A}$). If there exists an operator $\bar{A}^{-1}$, inverse with respect to $\bar{A}$, the symbol N ($\bar{A}$) denotes a method for its acuual construction

$$N(\bar{A})\bar{y} = \bar{x}. \qquad (3)$$

The process consisting of approximating the spaces M_1 and M_2 by the spaces $\bar{M}_1$ and $\bar{M}_2$, the operator A by the operator $\bar{A}$, replacing equation (1) by equation (2) together with the N ($\bar{A}$) method of solving the latter equation is called the computation algorithm for solution of equation (1) and is denoted by A_n ($\bar{x}$). This A_n ($\bar{x}$) algorithm, in which the N ($\bar{A}$) method is replaced by the N*($\bar{A}$) method, is called the real computation algorithm for solution of equation (1) and is denoted by A_n*($\bar{x}$*). The basic properties of computation and real computation algorithms for the solution of one sufficiently-broad class of linear operator equations are then examined. Orig. art. has: 12 equations.

Card 2/3

ACCESSION NR: AP4012957

ASSOCIATION: Kiyevskiy gosudarstvenny*y universitet im. T. G. Shevchenko (Kiev State University)

SUBMITTED: 25Oct62 DATE ACQ: 26Feb64 ENCL: 00

SUB CODE: MM NR REF SOV: 000 OTHER: 000

Card 3/3

BONDARENKO, Prokofiy Stepanovich; OSTROVSKIY, A.S., red.

[Automation of continuous line systems] Avtomatizatsiia sistem potochnogo transporta. Moskva, Energiia, 1965. 103 p. (Biblioteka po avtomatike, no.132) (MIRA 18:6)

ACC NR: AR6033850 SOURCE CODE: UR/0044/66/000/007/B103/B104

AUTHOR: Bondarenko, P. S.

TITLE: Calculation algorithms for the approximate solution of operator equations

SOURCE: Ref. zh. Matematika, Abs. 7B559

REF SOURCE: Visnyk. Kyyivs'k untu. Ser. matem. ta mekhan., no. 7, 1966, 33-40

TOPIC TAGS: operator equation, algorithm, linear operator, mapping

ABSTRACT: The results of the author's monograph (RZhMat, 1964, 8B566K) cover a rather wide category of operator equations

$$Ax = y. \quad (1)$$

where A is the linear operator mapping the normed space X into the normed space Y. Assuming that the approximating spaces $\overline{X}$ and $\overline{Y}$ are complete subspaces of X and Y, respectively, and designating by $\overline{A}$ the linear operator mapping space X into space Y, the author considers the approximate equation

$$\overline{A}\overline{x} = \overline{y}. \quad (2)$$

Card 1/3 UDC: 518:517.948

ACC NR: AR6033850

in the place of equation (1). Then, having formulated the proximity condition for operators A and $\bar{A}$ and the condition of good approximation of elements $y \in Y$ by elements $\bar{y} \in \bar{Y}$, he defines the concepts of abstract and real calculation algorithms of the approximate solution of equation (1). The concept of the real calculation algorithm differs from the concept of the abstract calculation algorithm in that each step of the real calculation algorithm is assumed to be fulfilled in a number set with a finite number of binary (decimal) digits after the desimal point. This is due to the fact that, in addition to the ordinary parameters (estimate of the proximity of operators A and $\bar{A}$, estimate of the proximity of elements y and $\bar{y}^*$, etc.) the real calculation algorithm also contains as a parameter an estimate of the computational error which is permissible for each calculation step with regard to a given real calculation algorithm. Having constructed abstract calculation algorithms of the approximate solution of equation (1) and having determined the concepts of regular convergence and of the convergence of the abstract calculation algorithms, the author formulates and proves theorems containing the conditions of regular convergence (theorem 1) and of the convergence of abstract calculation algorithms (theorem 1a). Then, he determines the concept of the stability of a real calculation algorithm, and formulates and proves theorems containing the characteristics of real calculation algorithms (theorems 2 and 2a). In conclusion,

Card 2/3

ACC NR: AR6033850

the author proves a theorem which establishes that the stability of a real calculation algorithm results in an asymptotic convergence between the approximate and the exact solution (theorem 3).

SUB CODE: 18/

APPROVED FOR RELEASE: 06/09/2000 CIA-RDP86-00513R000206220010-8"

BONDARENKO, P.S.

Experimental determination of static and rotative moments of industrial machinery and mechanisms. Prom.energ. 16 no.9:8-13 S '61. (MIRA 14:8)
(Machinery, Kinematics of)

BONDARENKO, P.S.

Characteristics of the change in water level in a well which is being pumped at a constant discharge. Visnyk Kyiv. un. Ser. astron., mat. ta mekh. no. 1:57-61 '58. (MIRA 14:5)
(Wells)

32413

S/021/62/000/001/001/007
D251/D303

16,3400

AUTHOR: Bondarenko, P.S.

TITLE: On the continuation of solutions of differential equations

PERIODICAL: Akademiya nauk Ukrayins'koyi RSR. Dopovidi, no. 1, 1962, 3 - 4

TEXT: The author proposes a new sign for continuation of the solution of a system of ordinary differential equations in a semi-infinite interval. I is defined to be a segment in the t direction, p is a natural number, and $f_1, \ldots, f_p$ are real functions, defined in some region D of the real $(t, x^{(1)}, \ldots, x^{(p)})$ space. x(t) is a vector function in p-dimensional space with components $x^{(i)}(t)$ $(i = 1, \ldots, p)$ and f(t, x) a vector function with components $f_i(t, x^{(1)}, \ldots, x^{(p)})$ $(i = 1, \ldots, p)$. The equation

$$x' = f(t, x) \quad (' = d/dt) \tag{1}$$

Card 1/3

32413

is considered, where $f(x, t)$ is continuous in D and $x(t)$ is a vector function to be determined. The problem is to find I, containing the point t_0 and the function $x(t)$ defined and continuously differentiable on I, such that

$$(t, x(t)) \in D, \ (t \in I), \tag{2}$$

$$x'(t) = f(t, x(t)), \ (t \in I), \tag{3}$$

$$x(t_0) = x_0 . \tag{4}$$

X

The solution of (2)-(3) is called solution (k). The following result is stated without proof: Theorem: Let 1) $f(t, x)$ be continuous in every $(t, x^{(1)}, \ldots, x^{(p)})$ space; 2) On an arbitrary closed segment $t_0 \leqslant t \leqslant T$, which is contained in the semi-infinite interval $t_0 \leqslant t < \infty$, the function $\gamma(t, x, y)$ for arbitrary x and y in a segment of the $(t, x^{(1)}, \ldots, x^{(p)})$-space in the direction $t = \xi$, $t_0 \leqslant t \leqslant T$ satisfies

$$\nu_1(t) \leqslant \gamma(t, x, y) \leqslant \nu_2(t) \tag{5}$$

APPROVED FOR RELEASE: 06/09/2000 CIA-RDP86-00513R000206220010-8"

32413

On the continuation of solutions ... S/021/62/000/001/001/007
D251/D303

for $v_1(t)$ and $v_2(t)$ summed on the segment $t_0 \leqslant t \leqslant T$. Then the solution (k) exists and is unique in the semi-infinite interval $t_0 \leqslant t < \infty$. There are 7 references: 4 Soviet-bloc and 3 non-Soviet-bloc. The references to the English-language publications read as follows: A. Winter, Amer. Journ. of Math., 67, 2, 277, 1945; A. Winter, Amer. Journal of Math., 68, 14, 173, 1946.

ASSOCIATION: Kyyivs'kiy derzhavnyy universytet (State University of Kyyiv)

PRESENTED BY: Y.Z. Shtokalo, Academician AS UkrSSR

SUBMITTED: May 15, 1961

X

Card 3/3

NESHCHADIM, A.G., inzh.; LEDENEV, B.I., inzh.; BONDARENKO, P.Ye.

Using the "Titan V" screw press for processing sunflower seed. Masl.-zhir.prom. 25 no.4:7-8 '59. (MIRA 12:6)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut zhirov (for Neshchadim). 2. Rostovskiy maslozhirovoy kombinat "Rabochiy" (for Ledenev, Bondarenko).
(Rostov-on-Don--Oil industries--Equipment and supplies)

BONDARENKO, R. M.

A new effective detector for x-rays. D. V. Chepur, V. O. Petrusevich, and R. M. Bondarenko. Nauk. Zapiski Kiiv. Derzh. Univ. im. T. G. Shevchenka 15, No. 9, Zbirnik Fiz. Fak., No. 5, 85-92(1956).—It was discovered that HgI_2 ... very sensitive to a beam of x-rays. HgI_2 should be appr. for use with hard x-rays. The x-rays bring about a photoelec. current, which can be amplified by the use of visible light. HgI_2 can be used this way for the construction of photoresistors. Werner Jacobson

4

86103

26.2420
9.4177

S/112/59/000/012/014/097
A052/A001

Translation from: Referativnyy zhurnal, Elektrotekhnika, 1959, No. 12, p. 12, # 24005

AUTHORS: Lashkarev, V.Ye., Litovchenko, V.G., Omel'yanovskaya, N.M., Bondarenko, R.M., Strikha, V.I.

TITLE: Dependence of the Life Time of Minority Charge Carriers on Concentration of Antimony Admixture in Germanium

PERIODICAL: Nauk. shchorichnyk. Radiofiz. fak. Kyivs'k. un-tu, 1956, Kyiv, 1957, pp. 495-496 (Ukrainian)

TEXT: The dependence of the life time τ of minority charge carriers on the concentration of Sb up to the values approaching the solubility limit of Sb in Ge ($n = 4 \cdot 10^{18}$ cm^{-3}) has been studied. The concentration has been determined from the Hall effect, τ has been measured by optical methods. It has been established that with n increasing from $5 \cdot 10^{13}$ to 10^{15} cm^{-3}, the life time was inversely proportional to n (τ decreased from 300 to 15 microseconds). At a further increase

Card 1/2

86103

S/112/59/000/012/014/097
A052/A001

Dependence of the Life Time of Minority Charge Carriers on Concentration of Antimony Admixture in Germanium

of n the inverse proportionality did not hold and τ changed more slowly, attaining $\sim$ 2.5 microseconds at $n = 5 \cdot 10^{17}$ cm^{-3}. At n increasing up to $4 \cdot 10^{18}$ cm^{-3} the life time showed no noticeable decrease. When computing τ from the formula $D\tau = l_0^2$ the dependence of D on n was taken into account; at high values of n this dependence becomes strong. The found dependence of τ on n agrees with the Shockley-Reed recombination theory. There are 5 references.

A.F.A.

Translator's note: This is the full translation of the original Russian abstract.

Card 2/2

S/058/62/000/006/087/136
A057/A101

AUTHORS: Litovchenko, V. G., Strikha, V. I., Bondarenko, R. M.

TITLE: The effect of slow relaxation photo-emf of a point contact on germanium

PERIODICAL: Referativnyy zhurnal, Fizika, no. 6, 1962, 37, abstract 6E298 ("Visnik Kyivs'k. un-tu", 1958, no. 1, ser. fiz. ta khimii, v. 1, 123 - 128, Ukrainian; Russian summary)

TEXT: A slow exponential change in the photo-emf of a point collector on n- and p-Ge was observed after the start (or stop) of illumination ($\tau \gtrsim 5$ - 1,000 sec.). The slow change of the photo-emf on non-molded contacts attained 40% and more of the steady value. Thus the readings have to be made after a time $\gg \tau$ in the common methods of measuring the length of diffusion, in order to avoid errors. The time of relaxations depends considerably upon the specific resistance ($\tau \cong 60\rho^{1/2}$) sec. and the condition of the surface (it decreases with aging of the surface, adsorption of ethanol vapors, and molding). The surface nature of the observed effect is demonstrated, therefore the surface

Card 1/2

The effect of... S/058/62/000/006/087/136
A057/A101

electron system participates directly in the formation of a point Ge-detector.

V. Litovchenko

[Abstracter's note: Complete translation]

Card 2/2

41027

S/058/62/000/009/067/069
A057/A101

AUTHORS: Strikha, V. I., Bondarenko, R. M., Omel'yanovs'ka, N. M., Litovchenko, V. G.

TITLE: The effect of the specific resistance and life time of carriers on the current sensitivity of detectors of the centimeter range

PERIODICAL: Referativnyy zhurnal, Fizika, no. 9, 1962, 12, abstract 9-4-23g ("Visnik Kiyvs'k. un-tu", 1958, no. 1, ser. fiz. ta khimiy, v. 1, 143 - 144, Ukrainian; summary in Russian)

TEXT: One of the most important parameters of a superhigh-frequency reception detector is the current sensitivity β. This value depends in germanium upon the current, the displacement constant, the introduced admixtures, and the specific resistance of the materials. Alloying germanium with antimony best results were obtained for samples with a specific resistance of 0.003 - 0.01 ·ohm·cm. Dependences of the parameters of superhigh-frequency detectors upon the life time of minority carriers and the specific resistance of the material are clarified. Detectors of germanium, alloyed with Sb, Fe, and Ga were prepared.

Card 1/2

The effect of the...

S/058/62/000/009/067/069
A057/A101

The measurement of the specific resistance was carried out by means of a common compensation circuit, the measurements of the life time - on devices of the type Waldes and Adam. The current sensitivity was determined in a wide wavelength range of 3 - 70 cm. The results of the investigation demonstrated that the basic role in the change of the current sensitivity of reception detectors of the centimeter range is played by the specific resistance of the material, and not the volume lifetime of minority current carriers. There are 4 references.

A. G.

[Abstracter's note: Complete translation]

Card 2/2

41949

S/194/62/000/009/056/100
D295/D308

9.4000

AUTHORS: Strikha, V. I., Bondarenko, R. M., Omel'yanovs'ka, N. M. and Lytovchenko, V. H.

TITLE: The influence of specific resistivity and carrier life time on the current sensitivity of centimeter range detectors

PERIODICAL: Referativnyy zhurnal, Avtomatika i radioelektronika, no. 9, 1962, 12, abstract 9-4-23 g (Visnyk Kyivs'k. un-tu, Ser. fiz. ta khimiyi, no. 1, 1958, 143-144 (Ukr.; summary in Rus.))

TEXT: One of the most important parameters of microwave detectors is their current sensitivity ß. In germanium this quantity depends on current, d.c bias, doping and resistivity of the materials. In alloying germanium with antimony the best results have been obtained for samples with resistivity of 0.003 - 0.01 Ω x cm. The dependence of parameters of microwave detectors on the life time of minority carriers and on the resistivity of the material is estab-

Card 1/2

S/194/62/000/009/056/100
D295/D308

The influence of specific ...

lished. Detectors of germanium alloyed with Sb, Fe and Ga have been fabricated. The measurements of resistivity were carried out by the usual compensation method, and the measurement of life time by using Valdese and Adam's setup. Current sensitivity was determined over a wide wave-length range (3 - 70 cm). The results of the investigation have shown that the resistivity of the material, and not the volume life-time of minority carriers, contributes principally to the variation of current sensitivity of centimeter range receiving detectors. 4 references. /Abstracter's note: Complete translation./

Card 2/2

ACC NR: AP6021467 (N) SOURCE CODE: UR/0413/66/000/011/0087/0087

INVENTOR: Bondarenko, R. M.; Orlov, S. V.; Vayner, E. A.

ORG: None

TITLE: A device for studying flow in a shock tube. Class 42, No. 182372

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 11, 1966, 87

TOPIC TAGS: shock tube, flow analysis, aerodynamic R and D

ABSTRACT: This Author's Certificate introduces a device for studying flow in a shock tube. The unit contains a probe with pressure gauges, a specially shaped stand with guides for moving the tube, and a worm-gear speed reducer in this stand with an electric drive. The device is designed for determining flow uniformity in a supersonic shock tube. The probe is made in the form of two telescoping tubes with the outer tube mounted in the guides of the stand. A toothed rack fastened to this tube is used for connection to the electrically driven worm-gear speed reducer. The pressure gauges are connected to the readout instruments by telescoping tubes (e. g. copper tubing) with a sliding fit and sealing devices.

SUB CODE: 13, 20/ SUBM DATE: 06Jan65

Card 1/1

UDC: 620.176

BONDARENKO, R. N.

AUTHORS: Lashkarev, V. Ye., Litovchenko, V. G., Omel'yanovskaya, N. M., Bondarenko, R. N., Strikha, V. I. 57-11-2/33

TITLE: Lifetime Dependence of Foreign Current Carriers upon Concentration of Antimony Admixture in Germanium (Zavisimost' vremeni zhizni storonnikh nositeley toka ot kontsentratsii primesi sur'my v germanii).

PERIODICAL: Zhurnal Tekhn. Fiz., 1957, Vol. 27, Nr 11, pp. 2437-2439 (USSR).

ABSTRACT: The dependence of lifetime τ of the antimony concentration admixture is investigated up to the boundary which lies near the solubility boundary of antimony in germanium $n \cong 4.10^{18}$ cm^{-3} at a great number of germanium patterns. τ was measured by means of optical methods. It is shown that in the case of an increase of the antimony admixture concentration of from $n = 5.10^{13}$ cm^{-3} to $n = 10^{15}$ cm^{-3} it was again confirmed that τ is inversely proportional to n. In the case of a further increase of the concentration this is disturbed, is slowly reduced and reaches the value $\tau \cong 2,8 \mu$sec at $n = 5.10^{17}$cm^{-3}. This value scarcely changes in the case of a further increase of n up to the maximum concentrations ($n = 4.10^{18}$cm^{-3}). It is shown that

Card 1/2

57-11-2/33

Lifetime Dependence of Foreign Current Carriers upon Concentration of Antimony Admixture in Germanium.

the independence of the lifetime τ of n at great n follows immediately from the recombination theory of W. Shockley and W. Read a fact which was also observed here in the investigations. It is furthermore shown that in this case the deep-lying levels are responsible for the recombination. The conclusion can be drawn that the admixture atoms of the antimony are not immediately the effective recombination centres. Apparently the not controllable, deeper lying admixtures are responsible for the recombination. These admixtures are introduced either together with the antimony or they are already present in the germanium initial material. The introduction of antimony leads to an alteration of the position of the Fermi-level i. e. of the ionization degree of this recombination level which leads, however, to the increase of the recombination probability.

There are 2 figures and 3 Slavic references.

ASSOCIATION: **Kiyev State University** (Kiyevskiy gosudarstvennyy universitet).

SUBMITTED: April 15, 1957.

AVAILABLE: Library of Congress.

Card 2/2

SOV/120-58-2-32/37

AUTHORS: Bondarenko, R.N., Strikha, V.I., Sokolov, B.L.

TITLE: ~~Screening of the~~ Slit of a Measuring Waveguide for the Decimeter Range (Ekranirovaniye shcheli izmeritel'noy linii detsimetrovogo diapazona)

PERIODICAL: Pribory i Tekhnika Eksperimenta, 1958, Nr 2, pp 109-110 (USSR)

ABSTRACT: It is shown that, in work with industrial coaxial measuring lines designed for the decimeter range, the distribution of the electromagnetic field may be distorted when electromagnetic interference is present. The line IL-D is considered. A method for screening the slit of the measuring line is described. The screening device consists of a metallic band attached to the body of the line and covering the slit, two pulling drums with springs, and special guides which fix the position of the ribbon relative to the probe of the measuring line. An aperture is drilled at the centre of the metallic band and the probe is inserted through this aperture. Fig.1 shows the distribution of the electromagnetic waves along the line without the screening attachment, and Fig.5 shows the improved pattern obtained with a screened slit. The accuracy of measurement is

Card 1/2

SOV/120-58-2-32/37

Screening of the Slit of a Measuring Waveguide for the Decimeter Range.

thus clearly improved and the line can be used for small incident power. Thus for example the distribution shown in Fig.5 was obtained with $\lambda = 60$ cm and $W = 4 \times 10^{-6}$ watt. There are 5 figures, no tables or references.

ASSOCIATION: Kiyevskiy gosudarstvennyy universitet (Kiyev State University)

SUBMITTED: June 24, 1957.

1. Waveguide slots--Equipment 2. Electromagnetic waves--Control 3. Electromagnetic waves--Measurement

Card 2/2

LASHKAREV, V.Ye. [Lashkar'ov, V.IE]; BONDARENKO, R.N. [Bondarenko, R.M.]; DOBROVOL'SKIY, V.N. [Dobrovol's'kyi, V.M.]; ZUBRIN, G.P. [Zubrin, H.P.]; LITOVCHENKO, V.G. [Lytovchenko, V.H.]; STRIKHA, V.I.

Properties of germanium containing beryllium admixtures. Ukr. fiz. zhur. 4 no.3:372-375 My-Je '59. (MIRA 13:2)

1. Kiyevskiy gosudarstvennyy universitet im. T.G. Shevchenko. (Germanium) (Beryllium)

ACC NR: AP6010737 SOURCE CODE: UR/0142/66/009/001/0146/0148

AUTHOR: Bondarenko, R. N.; Gladyshev, G. I.

ORG: none

42
13

TITLE: Frequency shift in a TWT 25

SOURCE: IVUZ. Radiotekhnika, v. 9, no. 1, 1966, 146-148

TOPIC TAGS: traveling wave tube, traveling wave amplifier, frequency shift

ABSTRACT: The possibility of controlled frequency shifting of a TWT output is investigated. The author analyzes a shifter based on sawtooth modulation of the accelerating voltage, v_0. Equations for optimum slope and amplitude of a modulating sawtooth are developed under the assumption of a small accelerating voltage deviation ($\Delta v/v_0 \ll 1$). A block diagram and output waveforms from a 3-cm experimental setup are given. Over a shift range of 1 to 200 kc, shift losses were less than 1 db, indicating the feasibility of the method. With no correction, output amplitude is also modulated up to 25% with the proposed method, but by proper feedback and choice of anode current, this figure was substantially reduced. Orig. art. has: 10 formulas and 4 figures. [SH]

SUB CODE: 09/ SUBM DATE: 21May63/ ORIG REF: 002/ OTH REF: 002/ ATD PRESS: 4224

Card 1/1 UDC: 621.376.326

ACC NR: AP6003562 SOURCE CODE: UR/0109/66/011/001/0149/0150

AUTHOR: Bondarenko, R. N.; Gladyshev, G. I.

ORG: none

31
B

TITLE: Measuring dielectric constants of liquids in a resonator

SOURCE: Radiotekhnika i elektronika, v. 11, no. 1, 1966, 149-150

TOPIC TAGS: dielectric constant, electric measurement

ABSTRACT: A modification of the well-known method of measurement of complex dielectric constant (G. Birnbaum et al., J. Appl. Phys., 1949, v. 20, no. 8, p. 817) is suggested. The test capsule is half-filled with the test liquid and is inserted into a rectangular resonator. The capsule can be moved in the resonator by a screw. First, the measurements are made with the empty part of the capsule and then, with the filled part. Hence, the effect of the capsule material is excluded from the final results. Odd TE_{01n}-modes are used. Orig. art. has: 1 figure and 2 formulas.

SUB CODE: 09 / SUBM DATE: 27Mar65 / ORIG REF: 002 / OTH REF: 001

Card 1/1 UDC: 621.317.374:532

RAPOPORT, G.N.; BONDARENKO, R.N.; GLADYSHEV, G.I.

Clarification of a formula for determining the specific inductive capacitance of samples using a resonance frequency shifting technique. Radiotekh. i elektron. 9 no.7:1319-1320 Jl '64 (MIRA 17:8)

BONDARENKO, R. V., and OLSHANSKAIA,

"Orientation of Pictures on STD-1 by Using Four Altitude Points From Camera Determination of the Main Point of the Right Picture of the Stereocouple"
Sb. ref. Tsentr. n-i. in-ta geod., aeros'yemki i kartogr. No 1, 1954, 50-51

The method consists in the approximate orientation of the stereocouple tolerating 0.05 to 0.10 mm errors. The measured discrepancies of longitudinal parallaxes are used to fix the main point on the right picture as mean arithmetic of the two determinations. Thereafter the discrepancies of longitudinal parallaxes of basic points are established in relation to the main point of the right and the stereocouple definitsively oriented. (RZhAstr, No 10, 1955)

SO; Sum-No. 787, 12 Jan 56

BONDARENKO, S.

Vody Dnepra poidut v Krymskie stepi. [The Dnieper water will reach the Crimean steppes]. (Sovkhoznaia gazeta, 1950, Sept. 26)

Zadachi vtoroi piatletki vodnogo transporta. [The problems of the second five-year plan in waterway transportation]. (Vodnyi transport, 1934, no. 3, p. 5-6)

SO: Soviet Transportation and Communication, A Bibliography, Library of Congress, Reference Department, Washington, 1952, Unclassified

BONDARENKO, S.A.; BONDAREVSKIY, S.N.; KHILIN, M.S.; KATS, Ye.A. (g. Kuybyshev); KRIVOV, N.V. (Stalinskaya oblast'); MULTANOVSKIY, V.V.

Teachers' letters on a physics textbook. Fiz. v shkole 17 no.3: 76-77 My-Je '57. (MLRA 10:6)

1. 5-ya srednyaya shkola, g. Kamensk-Shakhtinskiy (for Bondarenko). 2. 10ya srednyaya shkola, st. Kiyev (for Bondarevskiy). 3. 1-ya srednyaya shkola, Belgorodskyaya oblast', g. Gubkin (for Khilin). 4. 1-ya Belokholunitskaya srednyaya shkola Kirovskoy oblasti (for Multanovskiy).

(Physics--Textbooks)

L 3370-66 EWT(1)/EWT(m)/EWP(i)/T/EWP(t)/EWP(b)/EWA(h)/EWA(c) IJP(c)

ACCESSION NR: AT5020496 JD/GS UR/0000/64/000/000/0476/0490

AUTHORS: Fedorov, Yu. I.; Bondarenko, S. D.

TITLE: The use of acid-resisting light-sensitive emulsions to produce local inhomogeneities with high resolution in single crystals and films of germanium and silicon

SOURCE: Mezhvuzovskaya nauchno-tekhnicheskaya konferentsiya po fizike poluprovodnikov (poverkhnostnyye i kontaktnyye yavleniya). Tomsk, 1962. Poverkhnostnyye i kontaktnyye yavleniya v poluprovodnikakh (Surface and contact phenomena in semiconductors). Tomsk, Izd-vo Tomskogo univ., 1964, 476-490

TOPIC TAGS: germanium, silicon, emulsion, semiconductor, etched crystal, ultraviolet light, photoengraving

ABSTRACT: Photosensitive acid-resisting emulsions for use in photoengraving of semiconductor parts and semiconductor surfaces were synthesized and tested. Etching agents were prepared for use on germanium and silicon, films of germanium and silicon, silicon oxides, and gallium arsenide single crystals. Sensitizers that increase the sensitivity of the emulsions to ultraviolet light are indicated. Over 20 preparations—including natural colloids, organosilicon compounds,

Card 1/2

L 3370-66
ACCESSION NR: AT5020496

O

cinnamic aldehyde, emulsions based on azo and diazo compounds and polymeric polyesters--were tested. The photoengraving method consists of preparation of surfaces, application of emulsion, exposure, development, heat tanning, ultraviolet tanning, etching, and washing and drying. It was found that the esters of polystyrene and cinnamic acid, polyvinyl alcohol, and cinnamic acid have high dielectric characteristics that change negligibly with time. It was also found that some of the resins that were synthesized are universal for photoengraving emulsions for the above-mentioned semiconductor materials. The sensitized emulsions that were used retained their ability to be tanned by ultraviolet rays for several months. Orig. art. has: 4 graphs, 3 photographs, 1 table, and 6 formulas.

ASSOCIATION: none

SUBMITTED: 06Oct64 ENCL: 00 SUB CODE: SS

NO REF SOV: 000 OTHER: 000

Card 2/2 md

BONDARENKO, S.F., mayor med. slushby

Improving the condition of the respiratory tract. Voen.med.zhur. no.3:89 Mr '57. (MIRA 11:3)
(RESPIRATORY ORGANS)

BONDARENKO S.F

BONDARENKO, S.F. (Primorskiy kray)

Relation between chronic rhinitis and chronic tonsillitis [with summary in English]. Vest.oto-rin. 19 no.6:74-77 N-D '57 (MIRA 11:3)

(COMMON COLD, ther.
tonsillectomy in chronic cold with tonsillitis)
(TONSILLITIS, compl.
common cold, tonsillectomy)
(TONSILLECTOMY, in various dis.
common cold with tonsillitis)

BONDARENKO, S. F. (Lieutenant Colonel of the Medical Service)

"Method of Investigating Nasal Patency"

Voyenno-Meditsinskiy Zhurnal, No. 10, October 1961

BONDARENKO, S.F., podpolkovnik med.sluzhby

Method for investigating the passibility of the nose. Voen.-med. zhur. no.10:92 0 '61. (MIRA 15:5)
(NOSE)

37436
S/190/62/004/005/012/026
B110/B144

5.3700

AUTHORS: Ushakov, S. N., Belogorodskaya, K. V., Bondarenko, S. G.

TITLE: Synthesis of dimethyl-butyl-silyl ether of polyvinyl alcohol

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 4, no. 5, 1962, 704-707

TEXT: Synthesis and properties of dimethyl-butyl-silyl ether of polyvinyl alcohol have been described. Dimethyl-butyl aminosilane (b.p. 83-85°C/ 3-4 mm Hg; d_{20} = 0.808; n_D^{20} = 1.4354) obtained from dimethyl-butyl chlorosilane reacted with polyvinyl alcohol containing 1.3 mole% of acetate groups (viscosity 20 cp in benzene) in dry pyridine at ~100°C, and the ratio pyridine : polyvinyl alcohol was 50 : 1. The reaction products were separated in petroleum ether at a degree of substitution of 18-24 mole% and in a 4 : 1 mixture of methanol and water at a higher degree of substitution after formation of a homogeneous solution. The authors found: (1) The reaction rate increases with the dimethyl-butyl aminosilane excess. At a molar ratio of 1 : 2, dissolution

Card 1/3

sets in after 40-hr heating, and the degree of substitution is 18.48 mole%; at 1 : 4, dissolution takes place after 10-hr heating with a degree of substitution of 23.3 mole%. (2) The increase in the degree of substitution depends on the reaction time. A degree of substitution of 39.9 mole% is attained by increasing the reaction time from 5 to 25 hrs (ratio 1 : 3). The sum of hydroxyl, acetyl, and silicon ether groups was between 90 and 95 mole% owing to the loss of hydroxyl groups by dehydration. The IR absorption spectra 2815, 2950, and 2820 cm^{-1} corresponded to CH_2-CH(OH)-, -CH_2-CH($OCOCH_3$)-, and -CH_2-CH[$OSiC_4H_9(CH_3)_2$]- groups, respectively. The introduction of large, nonpolar groups caused an increase in solubility in nonpolar solvents. Introduction of 18.4 mole% of dimethyl butyl silyl groups reduced the vitrification temperature of polyvinyl alcohol from 80°C to 32.7°C since the hydrogen bonds between the chains were disturbed. The above ethers show better solubility in benzene and petroleum ether, poorer tensile strength, and greater elongation at rupture than triethyl silyl ethers. There are 3 tables.

Synthesis of dimethyl-butyl-silyl ... S/190/62/004/005/012/026
B110/B144

ASSOCIATION: Leningradskiy tekhnologicheskiy institut im. Lensoveta (Leningrad Technological Institute imeni Lensovet)

SUBMITTED: April 1, 1961

Card 3/3

NIKOLAYEV, A.F.; BONDARENKO, S.G.

Polymerization kinetics of a potassium salt of N-vinylsuccinamic acid in aqueous solution. Vysokom.soed. 7 no.10:1822-1825 O '65. (MIRA 18:11)

1. Leningradskiy tekhnologicheskiy institut imeni Lensoveta.

NIKOLAYEV, A.F.; BONDARENKO, S.G.

Synthesis of salts of N-vinylsuccinamic acid and metals of the group I. Zhur. ob. khim. 35 no.1:117-120 Ja '65.

(MIRA 18:2)

1. Leningradskiy tekhnologicheskiy institut.

L 00830-67 EWT(m)/EWP(j)/T IJP(c) DS/WW/RM

ACC NR: AP6027770 (A) SOURCE CODE: UR/0190/66/008/008/1368/1372

AUTHOR: Nikolayev, A. F.; Bondarenko, S. G.

30
B

ORG: Leningrad Technological Institute im. Lensovet (Leningradskiy tekhnologicheskiy institut)

TITLE: Cationites and polyampholites from copolymers of N-vinylsuccinimide and divinyl benzene

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 8, no. 8, 1966, 1368-1372

TOPIC TAGS: copolymer, divinyl benzene, hydrolysis, alkali, cationite, ampholite, polyampholite

ABSTRACT: Cationites with an exchange capacity of 5.8—6.4 meq/g and polyampholites with a total exchange capacity 6.65—7.48 meq/g were obtained from copolymers and telomers of N-vinylsuccinimade and divinyl benzene (divinyl benzene content 5.3 mol. %). Hydrolysis with a sodium hydroxide solution at 40—85C and alkali concentration of 5—40% was used. Hydrolysis is the second-order reaction. Orig. art. has: 3 figures and 1 table. [Based on authors' abstract] [NT]

SUB CODE: 07/ SUBM DATE: 28Jun65/ ORIG REF: 013/ OTH REF: 004/

Card 1/1 hs UDC: 541.64+678.13+678.746